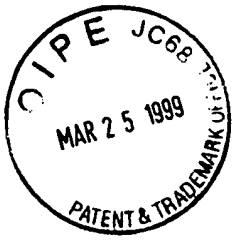
GAU 1752

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

FUJITA, MUNEHISA, et al.



Appln. No.: 08/915,683 Group Art Unit: 1752

Filed: August 21, 1997 Examiner: M. HUFF

For: DIRECT POSITIVE PHOTOGRAPHIC SILVER HALIDE EMULSION AND COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL COMPRISING SAME

REQUEST FOR ORAL HEARING

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Appellants hereby request an Oral Hearing in the above-identified application before the Patent and Trademark Office Board of Patent Appeals and Interferences.

A check in the amount of $260.00 for requesting an Oral Hearing is attached. Please charge or credit any difference or overpayment to Deposit Account No. 19-4880. **A duplicate copy of this sheet is attached.**

Respectfully submitted,

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Date: March 25, 1999

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APPELLANTS' REPLY BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In accordance with the provisions of 37 U.S.C. §1.193(b), Appellants respectfully submit this Reply Brief in response to the Examiner's Answer of January 25, 1999 (Paper No. 29), making the response due on or before March 25, 1999. Entry of this Reply Brief is respectfully requested.

Reply brief noted. MHH 4/7/99

I. Grouping of the Claims

Appellants' agree with the Examiner that Claims 1 and 5-9 should all stand or fall together.

II. Claims Appealed

The Examiner has noted minor clerical errors in the copy of appealed Claims 1 and 5-9 as set forth on pages 3 and 4 of the Answer.

In response, a corrected copy of Claims 1 and 5-9 on appeal is provided in the Appendix attached hereto.

III. Prior Art and Grounds of Rejection

Claims 1 and 5-9 remain rejected under 35 U.S.C. § 103(a) as being obvious over Evans et al. (USPN 4,504,570), further in view of Tanemura et al. (USPN 5,081,009) or Shuto et al. (USPN 5,110,719) as set forth on pages 5 and 6 of the Answer.

The Examiner's Position:

According to the Examiner, the core/shell tabular grains of Evans may be used in direct positive internal latent imaging. The emulsion B grains have a crystal morphology, and "a" and "b" values that are comparable to the instant claimed emulsion. Tanemura and Shuto disclose sulfur sensitizers of structures (A), (B) and (C) for obtaining high sensitivity, low D_{min} and high D_{max} silver halide emulsions. Whereas Evans does not teach a sulfur sensitizer of the present claims, the Examiner considered that one skilled in the art would have been motivated to incorporate the sulfur sensitizers of Tanemura or Shuto in the grains of Evans in order to obtain a tabular grain emulsion having increased sensitivity and D_{max} and decreased D_{min}.

Appellants' Reply:

Evans discloses silver iodobromide tabular grains, the surface of which may be chemically sensitized with sulfur and more particularly thiosulfate (column 22, lines 37-39). Evans is silent with respect to other sulfur compounds much less the sulfur compounds (A), (B) and (C) of the instant invention. Evans does not teach, suggest or appreciate the substitution of the instant sulfur compounds for thiosulfate. Moreover, the Examples of Evans actually rely solely on thiosulfate ions for achieving chemical sensitization, thus

leading one of ordinary skill away from the use of any other sulfur derivatives for chemical sensitization.

Appellants emphasize the experimental data in the Declaration filed March 4, 1998, wherein the sulfur compounds 1-16 (Table 3, 208 & 209), 2-3 (Table 3, 211), and 3-5 (Table 3, 212) corresponding to the generic formulae (A), (B) and (C), respectively, gave improved results with respect to D_{max}, D_{min}, middle sensitivity, and negative sensitivity as compared with the sodium thiosulfate-sensitized composition of Evans (Table 1, J1, and Table 3, 207). The instant claims preclude the addition of thiosulfate ion, whereas Evans discloses sodium thiosulfate pentahydrate, which in solution forms thiosulfate ion. This experimental evidence demonstrates improved results specifically in the absence of thiosulfate ion.

IV. Response to Argument

The Examiner maintained his objection to the declaration evidence for the reasons set forth on pages 6-8 of the Answer.

The Examiner's Position:

According to the Examiner, the data demonstrating an increase in maximum density, a decrease in minimum density and improved sensitivity for tabular grain emulsions sensitized with sulfur sensitizers is expected in view of the disclosures of Tanemura and Shuto. Furthermore, the Examiner considered that the claimed compounds (A), (B) and (C) are the preferred embodiment of the secondary references, each of which teaches the addition of silver bromide during formation of tabular grains. Thus, the Examiner considered that improvement in photographic characteristics would be expected.

Appellants' Reply:

The present invention, as claimed in Claim 1, is characterized by the combination of a specific tabular silver halide emulsion having a silver bromide core with a specific chemical sensitizer (A), (B) or (C). This combination has been found to surprisingly restrain the formation of a negative image in the silver halide tabular grain emulsion upon exposure to intense illumination. The effect of this combination would not be expected from the teachings of Tanemura et al. or Shuto et al. because these references do not address the problem of high illumination negative images. Negative image formation is not a significant problem with the octahedral grain emulsions of Tanemura et al. and Shuto et al., whereas with the tabular grain[1] emulsions of the present invention, negative image formation can significantly diminish the image quality of the direct positive image.

The unexpected effect of the present invention has been demonstrated in the Declaration of Matsunaga filed March 4, 1998, where the silver halide emulsion of the present invention was shown to exhibit remarkably low negative sensitivity as compared with the prior art emulsions.[2] As shown in Table 3 of the Declaration, Comparative Sample 210, comprised of a silver iodobromide core/shell of Evans and sensitized with the sulfur compound (A) (conc. 4.4 mg/Ag mol), undesirably exhibited significantly greater negative sensitivity[3] than Sample 209 of the invention, comprised of a silver bromide core/shell emulsion sensitized with the same concentration of the sulfur compound (A). Increasing the

[1] The tabular grains of the present invention are larger than the grains of regular crystal silver halide emulsions such as the octahedral silver halide emulsions of Tanemura and Shuto.

[2] Table 1 reveals the chemical characteristics for the inventive sample and comparative grains. I1 refers to the silver iodobromide seed crystal of Evans and I2 refers to the silver bromide seed crystal of the present invention. Table 2 describes the preparation of the emulsion, and indicates the layers according to the

concentration of compound (A) to 63.8 mg/Ag mol, resulted in an even further reduction in negative image formation for the silver bromide emulsion (Sample 208 of the invention). Silver bromide core/shell emulsions sensitized with sulfur compounds (A) (Samples 208-209), (B) (Sample 211) and (C) (Sample 212) exhibited significantly reduced negative image formation as compared with the same silver bromide core/shell but sensitized, instead, with sodium thiosulfate (Sample 213). Significantly, the silver bromide emulsion of Sample 213 did not show any reduction in negative image formation as compared with the silver iodobromide example of Evans, Sample 207, when sensitized with Evans' preferred sulfur agent, sodium thiosulfate pentahydrate.

A Table summarizing the results of Samples 208-210 is set forth below.

	Seed Crystal			Sensitizer			Negative Sensitivity Y	M	G
Sample 208	I2	AgBr core	(invention)	1-16	63.5	mg/mol Ag	78	76	80
Sample 209	I2	AgBr core	(invention)	1-16	4.4	mg/mol Ag	86	84	90
Sample 210	I1	AgBrI core	(Evans)	1-16	4.4	mg/mol Ag	112	117	121

Appellants submit that the combination of tabular grains having a silver bromide core and chemical sensitizing agents of the present invention produces unexpected results in reducing negative image formation as compared with the cited references.

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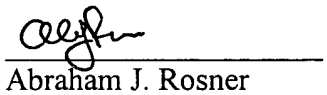
silver grain used to prepare the layer. The Emulsion numbers of Table 1 correspond with the Sample numbers of Tables 2 and 3 (*e.g.*, J1=207; J2=208; J3=209; J4=210; J5=211; J6=212; and J7=213).

[3] Sensitivity at an exposure time of 10^{-4} seconds.

CONCLUSION

In view of the foregoing argument, it is respectfully submitted that the rejection of Claims 1 and 5-9 over Evans in view of Tanemura or Shuto under 35 U.S.C. §103(a) is in error. Therefore, Appellants request the Board to reverse this rejection.

Respectfully submitted,



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APPENDIX

CLAIMS 1, and 5-9 ON APPEAL:

1. An internal latent image direct positive photographic silver halide emulsion comprising tabular silver halide grains having an average grain diameter of not less than 0.3 μm and an aspect ratio of from not less than 2 to not more than 100 in an amount of not less than 50% of all silver halide grains as calculated in terms of area; wherein said tabular silver halide grains are core/shell grains having a core and an external shell, the average grain thickness a along the main plane of the external shell thereof is from not less than 0.2 μm to not more than 1.5 μm and the average grain thickness b perpendicular to the main plane of the external shell thereof is from not less than 0.04 μm to not more than 0.30 μm; and

wherein the core of said core/shell grains are composed of silver bromide and are subjected to chemical sensitization in the presence of at least one compound selected from the group consisting of compounds represented by the following formula (A), (B) and (C) and a gold sensitizer in combination under the condition that substantially no thiosulfate ion is present during the chemical sensitization:

$R\text{-}SO_2\text{-}S\text{-}M$ (A)

$R\text{-}SO_2\text{-}S\text{-}R^1$ (B)

$R\text{-}SO_2S\text{-}(L)_m\text{-}SSO_2\text{-}R^2$ (C)

wherein R, R^1 and R^2 may be the same or different and each represents an aliphatic group, aromatic group or heterocyclic group; M represents a cation; L represents a divalent linking group; m represents 0 or an integer of 1; the compounds of the formula (A), (B) and (C) may be each in the form of a polymer containing, as a repeating unit, a divalent group derived from the structures represented by the formulae (A), (B) and (C), respectively; and R, R^1, R^2 and L may be optionally connected to each other to form a ring.

5. The internal latent image direct positive photographic silver halide emulsion according to Claim 1, wherein the external shell has an external phase which is chemically sensitized in the presence of at least one compound selected from the group consisting of the compounds represented by the formula (A), (B) and (C).

6. The internal latent image direct positive photographic silver halide emulsion according to Claim 1, which is prepared from a seed crystal emulsion which has been prepared via desalting process.

7. The internal latent image direct positive photographic silver halide emulsion according to Claim 1, wherein the average grain thickness a along the main plane of the external shell thereof is from not less than 0.4 μm to not more than 1.0 μm and the average grain thickness b perpendicular to the main plane of the external shell thereof is from not less than 0.06 μm to not more than 0.15 μm.

8. The internal latent image direct positive photographic silver halide emulsion according to Claim 1, wherein the thickness of grains are so uniform that the coefficient of variation of thickness is not more than 30%.

9. A color diffusion transfer photographic light-sensitive material comprising at least one photosensitive silver halide emulsion layer combined with a dye image-forming substance provided on a support, said dye image-forming substance comprising a nondiffusive compound represented by the following formula (I) which releases a diffusive dye or precursor thereof or changes in its diffusivity in connection with silver development,

wherein said at least one silver halide emulsion layer comprises at least one internal latent image type direct positive photographic silver halide emulsion comprising tabular silver halide grains having a core/shell structure with a core and an external shell, composed of silver bromide, and having an average grain diameter of not less than 0.3 μm and an aspect ratio of from not less than 2 to not more than 100 in an amount of not less than 50% of all silver halide grains calculated in terms of area, with the average grain thickness a along the main plane of the external shell thereof being from not less 0.2 μm to not more than 1.5 μm and the average grain thickness b perpendicular to the main plane of the external shell thereof being from not less than 0.04 μm to not more than 0.30 μm; wherein grains are subjected to chemical sensitization in the presence of at least one compound selected from the group consisting of compounds represented by the following formula (A), (B) and (C):

$R\text{-}SO_2\text{-}S\text{-}M$ (A)

$R\text{-}SO_2\text{-}S\text{-}R$ (B)

$R\text{-}SO_2S\text{-}(L)_m\text{-}SSO_2\text{-}R^2$ (C)

wherein R, R^1 and R^2 may be the same or different and each represents an aliphatic group, aromatic group or heterocyclic group; M represents a cation; L represents a divalent linking group; m represents 0 or an integer of 1; the compounds of the formula (A), (B) and (C) may be each in the form of polymer containing as a repeating unit a divalent group derived from the structure represented by the formulae (A), (B) and (C), respectively; and R, R^1, R^2 and L may be optionally connected to each other to form a ring; and

wherein formula (I) is as follows:

$(DYE\text{-}Y)_n\text{-}Z$

wherein DYE represents a dye group or a dye group precursor group whose absorption wavelength has been shifted to short wavelength; Y represents a mere bond or bridging group; Z represents a group which makes a difference in the diffusivity of the compound represented by $(DYE\text{-}Y)_n\text{-}Z$ or releases DYE to make a difference in diffusivity between the released DYE and $(DYE\text{-}Y)_n\text{-}Z$ in correspondence or counter correspondence to a photosensitive silver salt having an imagewise latent image; and n represents an integer of 1 or 2, with the proviso that when n is 2, the plurality of (DYE-Y)'s may be the same or different.